Correspondence

Estrogenicity of Resin-based Composites and Sealants in Dentistry

The recent article "Estrogenicity of Resin-based Composites and Sealants Used in Dentistry," appearing in the March 1996 *Environmental Health Perspectives* (EHP 104:298–305) raises some familiar concerns that critics of the profession have espoused. Historically, many of the materials that have been common in the dental armamentarium have assumed their role through historical acceptance. Bisphenol-A diglycidyl methacrylate (bis-GMA) has been tested for safety and efficacy at the ADA as a dental material. It has never been assessed for its estrogenicity. The thesis elaborated in this article states that the sealant and resin components bisphenol-A and bisphenol-A dimethacrylate are estrogenic and probably contribute to xenoestrogen exposure in humans.

The potential deleterious effects of bisphenol-A and its degradation products are well documented. However, considering past hysteria about dental amalgam and the potential for the spread of cross-contamination-type infections, the need should be for scientific evidence which will define if risk is present; and, if so, what is the gravity of that risk? Although the research reported was well done, it is a preliminary report. More comprehensive studies should be undertaken that will identify the potential for problems. Potential dangers that bisphenol-A-containing dental products possess should be assessed through scientific research. Hopefully, hysterical outcries form the press will not outweigh the need for quality investigation in this area. Programs that encompass research at the laboratory bench level should be undertaken and carried through animal models, and finally, *in situ* evaluation in humans should be elaborated.

As dental researchers, practicing wet fingered dentists, and academics, we feel that before conclusions are made condemning composite resins and resin sealants, scientific evidence should be gathered to deny or substantiate these concerns. As dental professionals who have seen dentistry criticized for the use of mercury in restoratives and the lack of appropriate disinfection procedures for our instruments and equipment, we feel that this issue should be resolved through competent scientific investigation. Hopefully, this issue will be addressed in a more intellectual and scientific manner than the emotion and hysteria that has been the center of some issues in dentistry in the recent past.

Charles M. Habib
Gerard Kugel
Department of Restorative Dentistry
Tufts University School of Dental Medicine
Boston, Massachusetts

MTBE Toxicity

Robert Drew of API wrote a letter to EHP concerning EHP's feature article on MTBE. Rather than pointing out Mr. Drew's errors and conclusions concerning the health dangers of MTBE in gasoline, I would like to respond by presenting the Collegium Ramazzini's position on this issue. I believe the annexed statement speaks for itself.

The Collegium Ramazzini, an independent organization dedicated to occupational health, and comprised of internationally renowned physicians and scientists from 30 countries (including the United States, Sweden, Finland, Germany, Japan, Canada, Italy, Belgium, and China), sponsors special conferences focusing on new developments that may impact public health and the environment.

On November 3, 1995, the Oil Chemical and Atomic Workers International Union (OCAW) and Collegium Ramazzini held a special scientific conference in Washington, D.C. where papers were submitted on the health effects of the motor gasoline additives methyl tertiary butyl ether (MTBE) and 1,3-butadiene.

Methyl tertiary butyl ether (MTBE) is a gasoline additive used principally during winter months. It comprises 11–15% of gasoline. Because of new federal regulations, it is being used in steadily increasing amounts in the United States. In 1979, a gallon of premium gasoline sold in the United States contained about 3% of the additive MTBE in about 10% of cars. Because of the Clean Air Act. oxygenated (reformulated) gasoline is sold in nine U.S. cities with the worst smog problems and in 17 states. Nearly one quarter of all gasoline sold through the country contains this additive. In 1992, the annual production of MTBE was 10.86 billion pounds (approximately 72,000 barrels per day).

A major regulatory failure is that MTBE was not adequately tested for either acute or chronic toxic effects before it was added in significant quantities to gasoline. Many consumers and workers, when exposed to gasoline containing MTBE, complain of extreme headaches, vomiting, diarrhea, fever, cough, muscle aches, sleepiness, disorientation, dizziness, and skin and eye irritation. MTBE is known to cause central nervous system (CNS) depression, tremors, ataxia, labored breathing, chronic inflammation of nasal mucosa, eye irritation, and skin rashes (*1*).

MTBE may also increase risk of cancer, and this risk was not adequately assessed prior to introducing this product into commerce. Recent studies by Belpoggi et al. (*2*) have shown that oral exposure to MTBE causes dose-related, statistically significant increases of lymphoma and leukemias, and of testicular Leydig cell cancers in rats. In 1992, Burleigh-Flayer et al. (*3*) reported that inhalation exposure to MTBE caused an increase in the number of liver tumors in mice. In males, there was a statistical increase in carcinomas, while in females, there was a statistically significant increase in adenomas. In 1992, Chun et al. (*4*) reported a statistically significant increase in kidney tumors in male rats after inhalation exposure. MTBE causes cancers in many organs and tissues of two species of experimental animals; these cancers are similar to those caused by exposures of comparable dose of benzene, vinyl chloride, and 1,3-butadiene, all recognized carcinogens.

There is general agreement among experts in chemical carcinogenesis that a substance which causes cancer in significant numbers of experminental animals in well-conducted assays poses a presumptive carcinogenic risk to some humans, even in the absence of conformatory epidemiological data.

The Collegium Ramazzini concludes that exposure to MTBE in gasoline should be avoided in order to prevent needless illnesses or both consumers and workers. The Collegium Ramazzini urges that the toxicity of MTBE be fully and vigorously examined. It is not prudent to permit wide environmental releases of a compound that may cause acute illness as well as cancer.

Myron A. Mehlman
Collegium Ramazzini
North American Secretariat
Princeton, New Jersey

References

1. Mehlman MA. Dangerous and cancer-causing properties of products and chemicals in the oil refining and petrochemical industry: Part XV. Health hazards and health risks form oxygenated automobile fuels (MTBE): lessons not heeded. Int J Occup Med Toxicol 4(2):219–236 (1995).
2. Belpoggi F, Soffritti M, Maltoni C. Methyl tertiary butyl ether (MTBE)—a gasoline additive—causes testicular and lymphohaematopoietic cancers in rats. Toxicol Ind Health 11(2):119–149 (1995).
3. Burleigh-Flayer HD, Chun JS, Kintigh WJ. Methyl tertiary butyl ether: vapor inhalation oncogenicity study in CD-1 mice. BRRC report 91N0013A. Export, PA:Union Carbide, 1992.
4. Chun JS, Burleigh-Flayer HD, Kintigh WJ. Methyl tertiary butyl ether: vapor inhalation oncogenecity study in Fischer 344 Rats. BRRC report 91N0013B. Export, PA:Union Carbide, 1992.